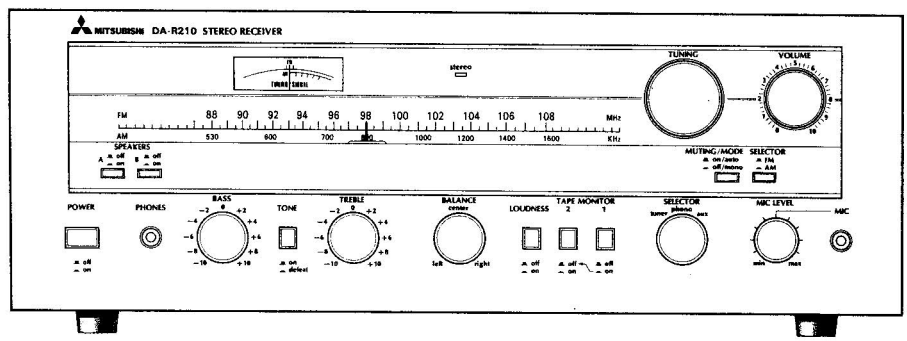
MITSUBISHI
AUDIO SYSTEMS

SERVICE MANUAL

STEREO RECEIVER

MODEL DA-R210



CONTENS

SPECIFICATIONS 2
PANEL OPERATIONS 5
HOW TO DISASSEMBLE 7
ADJUSTMENT 8
DIAL STRINGING DIAGRAM 9
CIRCUIT BOARD 10
SCHEMATIC DIAGRAM 13
WIRING 15
EQUIVALENT CIRCUIT DIAGRAM 17
PARTS LIST 18

MITSUBISHI ELECTRIC EUROPE GMBH

SPECIFICATIONS

1-(1) FM TUNER SECTION (IHF)

Usable sensitivity	
MONO	13.2dBf (2.5μV)
STEREO	23.0dBf (7.8μV)
50dB quieting sensitivity	
MONO	20.0dBf (5.5μV)
STEREO	40.0dBf (5.5μV)
Signal to noise ratio (at 98MHz, 1mV)	
MONO	75dB
STEREO	70dB
Frequency response	± 3dB from 40Hz to 15kHz
Total harmonic distortion (at 1kHz, 100% modulation)	
MONO	0.2%
STEREO	0.3%
Capture ratio	1.0dB
Alternate channel selectivity (±400kHz)	55dB
Spurious response ratio (at 98MHz)	70dB
Image response ratio (at 108MHz)	60dB
IF response ratio (at 88MHz)	80dB
AM suppression ratio	50dB
Stereo separation	40dB at 1kHz, 30dB at 10kHz
Subcarrier product ratio	30dB
Tuning range	87.5MHz to 108MHz

1-(2) FM TUNER SECTION (DIN)

Sensitivity (at 40kHz deviation)	
MONO (S/N 26dB)	1.2μV
STEREO (S/N 46dB)	32μV
Image frequency rejection (at 108MHz)	60dB
IF rejection (at 88MHz)	80dB
Spurious rejection (at 98MHz)	70dB
AM rejection	50dB
Selectivity (at 40kHz deviation, ± 300kHz)	50dB
Signal to noise ratio (at 40kHz deviation unweighted)	
MONO	68dB
STEREO	66dB
(at 40kHz deviation weighted)	
MONO	70dB
STEREO	68dB
Total harmonic distortion (at 1kHz, 40kHz deviation)	
MONO	0.2%
STEREO	0.4%
Stereo separation (at 1kHz, 40kHz deviation)	40dB
Frequency response	± 3dB from 40Hz to 15kHz

2-(1) AM TUNER SECTION (IHF)

Usable sensitivity (bar antenna at 30% modulation, S/N 26dB	40dB
Selectivity	35dB
Total harmonic distortion (at 5m V/m, 30% modulation)	0.8%
Image response ratio (at 1400kHz)	40dB
IF response ratio (at 600kHz)	60dB
Hum and noise (94 dB)	50dB
Tuning range	525kHz to 1605kHz

2-(2) AM TUNER SECTION (DIN)

Sensitivity (bar antenna, at 30% modulation, S/N 26dB)	300μV/m
Signal to noise ratio (at 5mV/m, 30% modulation)	50dB
Selectivity (at ± 9kHz)	30dB
Image frequency rejection (at 1400kHz)	40dB
Total harmonic distortion (at 5mV/m, 30% modulation)	1.0%
Tuning range	525kHz ~ 1605kHz

3. PREAMPLIFIER SECTION

Input sensitivity/impedance (at continuous rated power output, 8 ohms, 1kHz)	
PHONO	2.5mV/50k ohms
TUNER, AUX, PLAY 1, 2 (PIN)	150mV/35k ohms
PLAY 1, 2 (DIN)	150mV/35k ohms
MIC	1mV/10k ohms
Phono overload level (at 1kHz, with 0.1% THD)	
PHONO	200mV
Output level/impedance	
REC 1, 2 (PIN)	150mV/600 ohms
REC 1, 2 (DIN)	50mV/100k ohms
Frequency response	
PHONO	± 0.5dB from 20Hz to 20kHz (RIAA STD)
TUNER, AUX, PLAY 1, 2	+ 0.5dB, –1dB from 20Hz to 20kHz (in TONE DEFEAT switch ON position)
Tone control	
BASS	± 8dB at 100Hz
TREBLE	± 8dB at 10kHz
Loudness (Volume control set at –30dB position)	
	+7dB at 100Hz
	+5dB at 10kHz
Hum and noise (A network closed circuit)	
PHONO	72dB
TUNER, AUX, PLAY 1, 2	95dB
Hum and noise (DIN, 50mW x 2)	
PHONO	60dB
TUNER, AUX, PLAY 1, 2	62dB

4. POWER AMPLIFIER SECTION

Power output	25W continuous power per channel, both channels driven into 8 ohms from 20Hz to 20kHz, with 0.1% THD 30W continuous power per channel, both channels driven into 4 ohms from 20Hz to 20kHz, with 0.3% THD
Total harmonic distortion	0.03% at 12.5W per channel both channels driven into 8 ohms at 1kHz 0.03% at 1W per channel both channels driven into 8 ohms at 1kHz
Intermodulation distortion (70Hz and 7kHz, 4 : 1)	0.2% at rated power per channel, 8 0.1% at 1W power per channel, 8 ohms
Power bandwidth (IHF)	10Hz to 40kHz at 0.1% THD, 8 ohms
Damping factor	25 from 20Hz to 20kHz, 8 ohms

5. GENERAL

Power consumption	140W (IEC nominal)
Dimensions (W x H x D)	425 x 154 x 324 mm (16-3/4 x 6 x 12-3/4")
Weight	8.5 kg (18-1/2 lb)

Design and specifications are subject to change without notice for improvement.

PANEL OPERATIONS

FRONT PANEL

SPEAKERS (Speaker Selection Switches)

These switches control speaker selection.

A	B	
■	■	For listening with headphones. The speakers are disconnected.
■	■	For listening to the speakers connected to terminals A.
■	■	For listening to the speakers connected to terminals B.
■	■	For listening to the speakers connected to terminals A and B.

TUNING/SIGNAL (Tuning/Signal Mater)

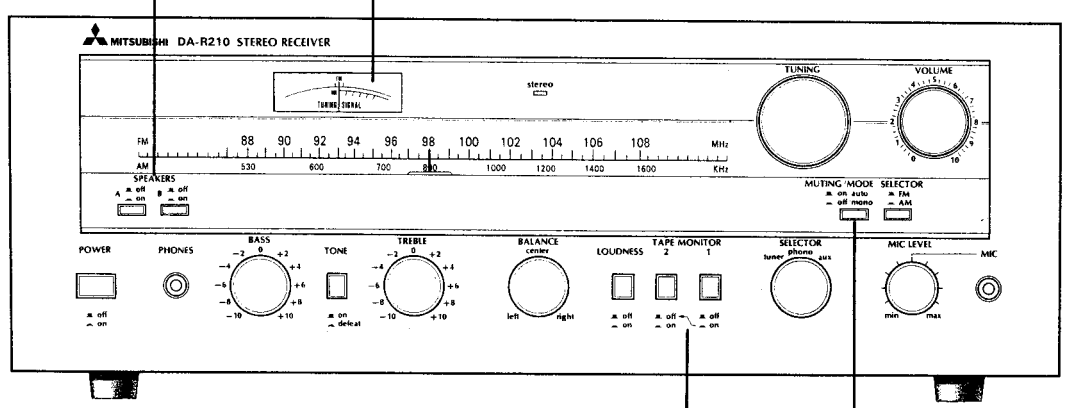
This meter shows the most distortion-free position for receiving the FM signal and the signal strength level of AM signal.

FOR FM BROADCAST RECEIPTION

Tune it so that the indicator of the meter comes to the center.

FOR AM BROADCAST RECEIPTION

Tune it so that the indicator of the meter swings to the extreme right.



TAPE MONITOR (Tape Monitor and Duplicate Switch)

These switches are used for monitoring either the program source being recorded or the playback from the tape deck, and duplicating from the tape to tape.

2	1	
■	■	In this position, you can reproduce the program source set by the SELECTOR switch and record them with tape deck connected to REC1 and REC 2 outputs or TAPE 1 and TAPE 2 sockets.
■	■	For playing or record monitoring of the tape deck connected to PLAY 1 (TAPE 1) inputs, and duplicating from the tape deck connected to PLAY 1 (TAPE 1) inputs to the tape deck connected to REC 2 (TAPE 2) outputs.
■	■	For playing or record monitoring of the tape deck connected to PLAY 2 (TAPE 2) inputs.

MUTING/MODE (Muting/Mode Selection Switch)

This switch is for selecting the mode of FM reception you desire.

ON/AUTO For receiving a FM stereo broadcast. In this position, the interstation noise is eliminated while tuning.

OFF/MONO For receiving a monaural FM broadcast. In this position, the interstation noise is not eliminated while tuning, enabling weaker FM broadcasts to be tuned in. Stereo broadcasts are also received monaurally.

REAR PANEL

ANTENNA (Antenna Terminals)
These terminals are used for connecting FM and AM antennas. For more details, see page 8.

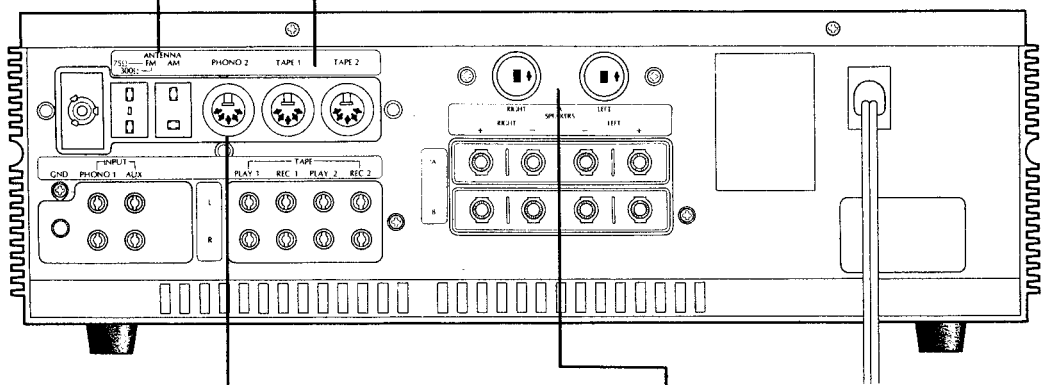
AM (AM and Ground External DIN Antenna Socket)
Connect DIN antenna cords with ground wires to this socket for AM reception.

FM 300Ω (FM300 ohms DIN Antenna Socket)
Connect 300 ohms DIN antenna cords to this socket for FM reception.

FM75Ω (FM75 ohms DIN Antenna Socket)
Connect 75 ohms DIN antenna cords to this socket for FM reception.

GND (Ground Screw Terminal)
Sometimes, hum or other noise may develop when a turntable is connected to this unit. In such a case, connect the ground wire of a turntable to this terminal.

TAPE 1, TAPE 2 (Tape Playback & Recording DIN Sockets)
These sockets are for tape playback and recording. Connect the tape deck DIN plugs here.



PHONO (Phono PIN/DIN Inputs)
The input impedance is 50 k ohms. The output leads from the turntable are connected here.

SPEAKERS (Speaker DIN Socket)
Speakers A may be connected here. Do not use the Speakers A (screw terminals) at the same time.

HOW TO DISASSEMBLE COVER, PLATE & PANEL

1. Top Cover Removal

1) Remove the six screws on backside as shown in Fig. 1. Remove the top cover by pulling it upwards.

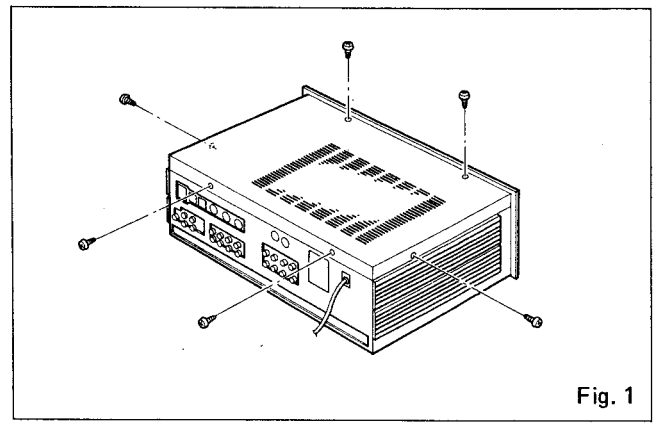


Fig. 1

2. Bottom Plate Removal

If the five screws (A) shown in Fig. 2 are removed, the bottom plate can be taken out.

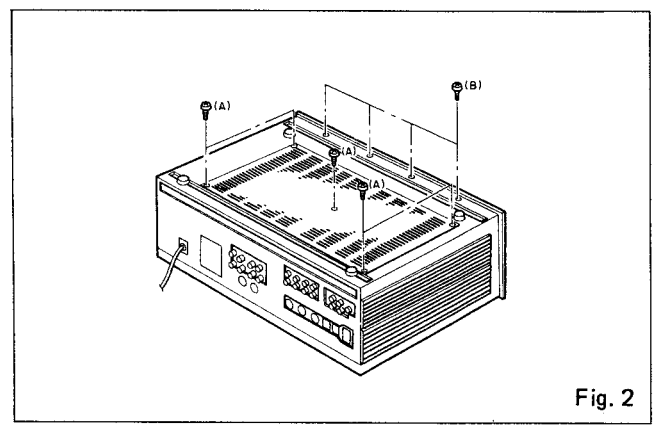


Fig. 2

3. Front Panel Removal

1) Remove the top cover (See Removal Procedure 1).
2) Remove the four screws (B) shown in Fig. 2.
3) Remove the two screws shown in Fig. 3.
4) Pull out the knob as shown in Fig. 4 and remove the mounting nut. To remove the front panel in this state, pull it towards you.

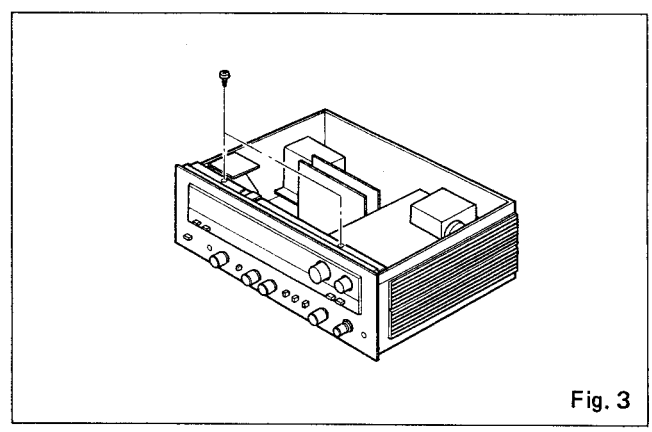


Fig. 3

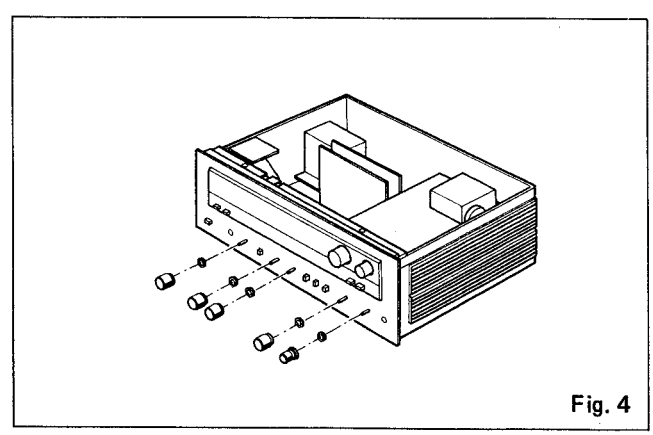


Fig. 4

ADJUSTMENT

AM Adjustment

1) Set BAND SELECTOR switch to AM position.
2) Connect output from SG (SIGNAL GENERATOR) to LOOP ANTENNA.
3) The output from the stereo receiver set is taken from the terminal (8) or (9) of the printed circuit board of the tuner to be connected to the AC voltmeter.
4) Adjust SG frequency to 525 KHz.
5) Set the dial to the lowest frequency, and adjust T201 to receive 525 KHz from SG.
6) Adjust SG frequency to 1605 KHz then.
7) Set the dial to the highest frequency and adjust C211 trimmer capacitor to receive 1605 KHz from SG.
8) Adjust SG frequency to 600 KHz.
9) Tune the dial to 600 KHz and adjust L201 (bar antenna) to obtain the maximum sensitivity.
   Note: As antenna coil bobbins are fixed by wax, melt them using a soldering iron.
10) Adjust SG frequency to 1400 KHz.
11) Tune the dial to 1400 KHz and adjust C202 (the trimmer on the variable capacitor) to obtain the maximum sensitivity.
12) Repeat the same procedures mentioned in Items 8 to 11 to obtain the maximum sensitivity at 600 KHz and 1400 KHz.
13) Adjust SG frequency to 1000 KHz.
14) Tune the dial to 1000 KHz and adjust T202 to obtain the maximum sensitivity.

FM Adjustment

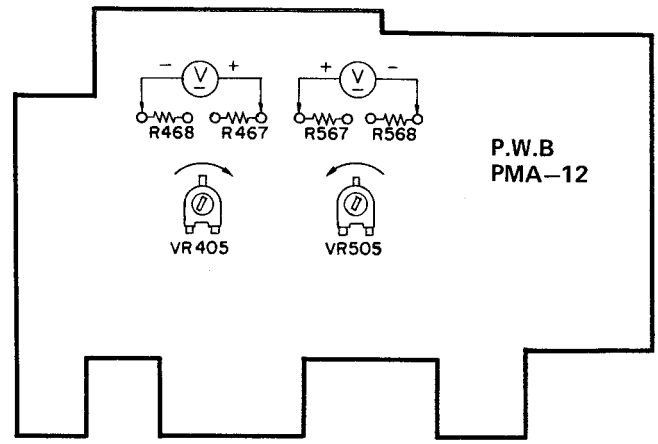
1. FM Front End Adjustment
   1) Set the BAND SELECTOR switch to FM position.
   2) Connect the output of SG to the terminal of FM antenna.
   3) The output from the stereo receiver set is taken from the terminal (8) or (9) of the printed circuit board of the tuner to be connected to the AC voltmeter.
   4) Adjust SG frequency to 87.4 MHz.
   5) Set the dial to the highest frequency and adjust L103 to receive 87.4 MHz from SG.
   6) Adjust SG frequency to 109 MHz.
   7) Set the dial to the highest frequency and adjust C116 trimmer capacitor to receive of 109 MHz from SG.
   8) Adjust SG frequency to 87.4 MHz.
   9) Set the dial to the lowest frequency to receive 87.4 MHz from SG. Adjust L101, L102 and T101 to obtain the maximum sensitivity.
   10) Adjust SG frequency to 109 MHz.
   11) Set the dial to the highest frequency to receive 109 MHz from SG. Adjust C102 and C107 trimmers to obtain the maximum sensitivity.
   12) Repeat the same procedures mentioned in the Items 8 to 11 to obtain the maximum sensitivity at 87.4 MHz and 109 MHz.
2. FM Discriminate Transformer Adjustment
   1) Set MUTING switch to OFF position.
   2) Turn the dial to any position in which no signal is received. Adjust T102 to make the indicator of the center meter come in the center.
   3) Set the SG to 98 MHz and modulate 1 KHz 100%/mono.
   4) Connect distortion meter to the terminal (8) or (9) of the tuner printed circuit board.
   5) Set MODE switch to FM MONO position.
   6) Tune the dial to 98 MHz and adjust T103 to obtain the minimum distortion factor.
3. FM MPX Adjustment
   Connect the frequency counter between the terminal (14) (TP2) of the tuner printed circuit board and the ground to adjust VR101 to 19 KHz.

AUDIO FREQUENCY PRINTED CIRCUIT BOARD ADJUSTMENT

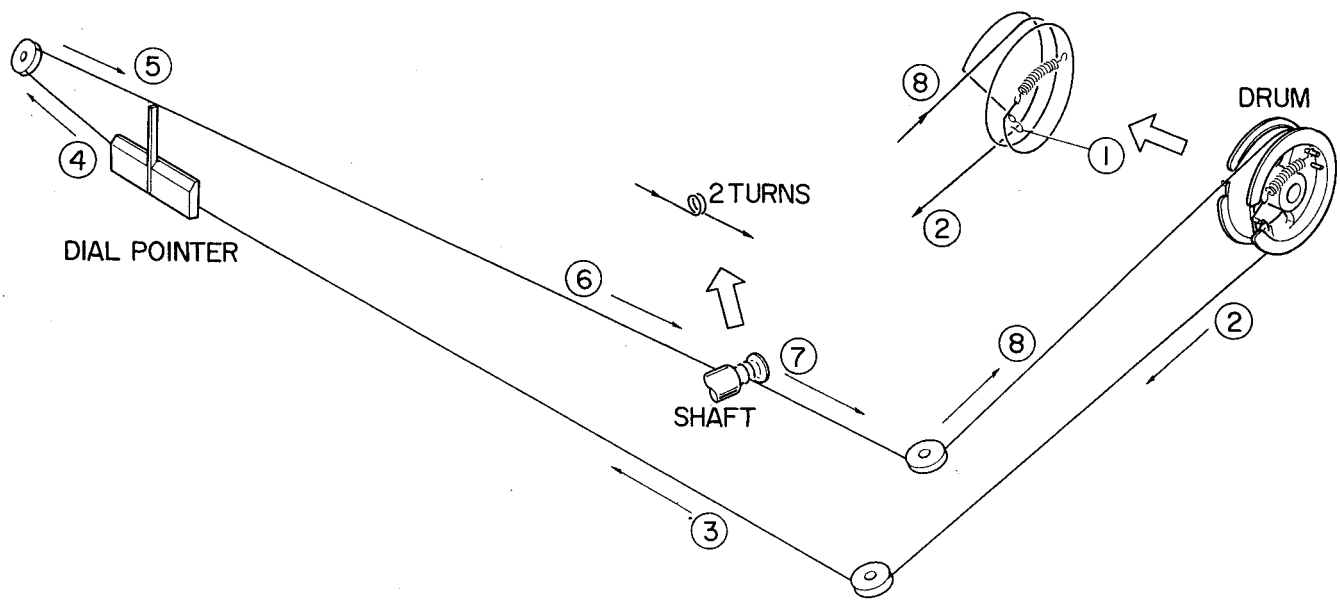
How to Adjust Idling Current

1) Turn VR405 and VR505 thoroughly in the opposite direction of the arrow.
2) Turn on power switch.
3) Turn VR405 and VR505 in the direction of the arrow so that voltage at either end of R467 – R468 and R567 – R568 become 27 ± 5 mV.

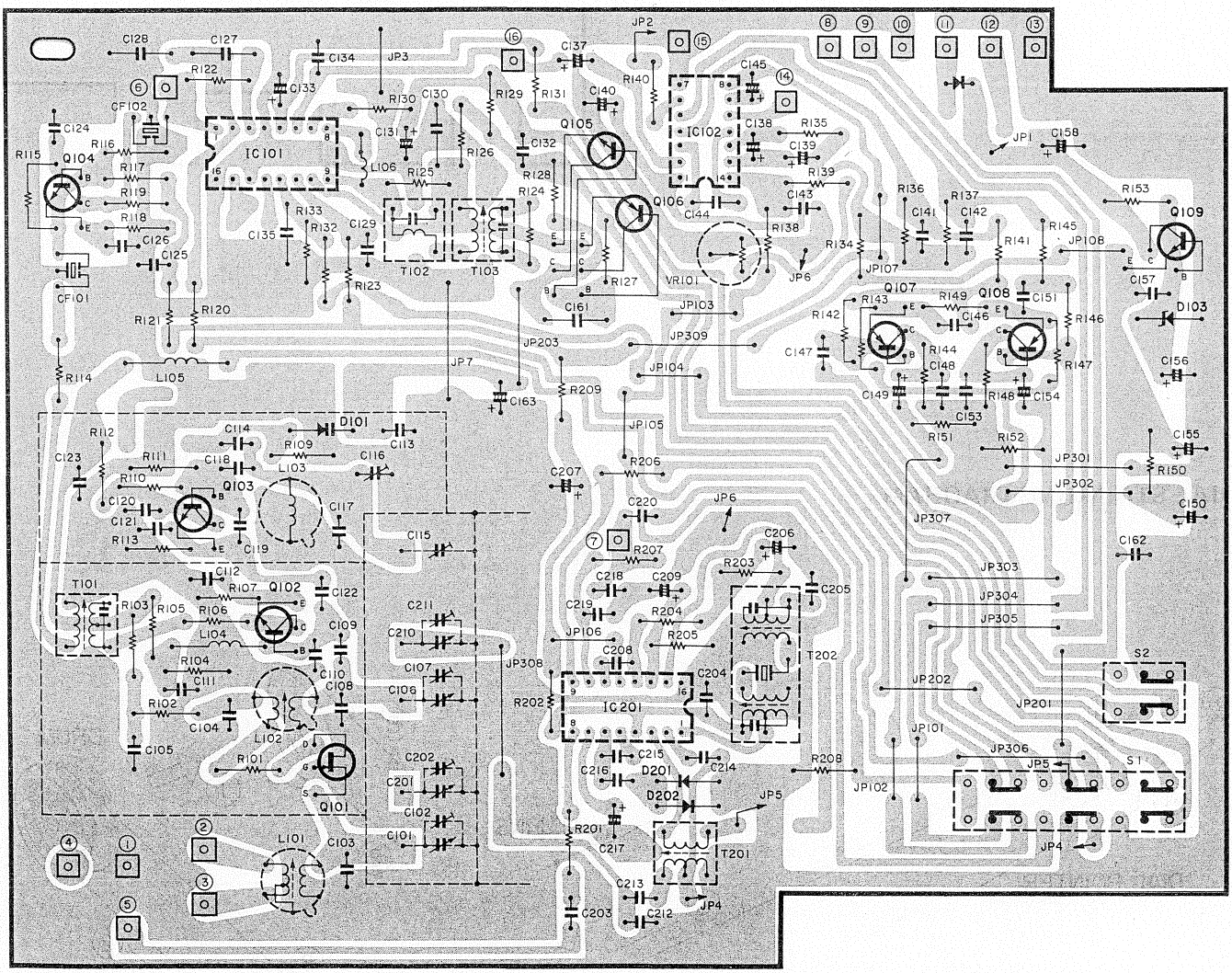
PRINTED WIRING BOARD (PARTS SIDE)



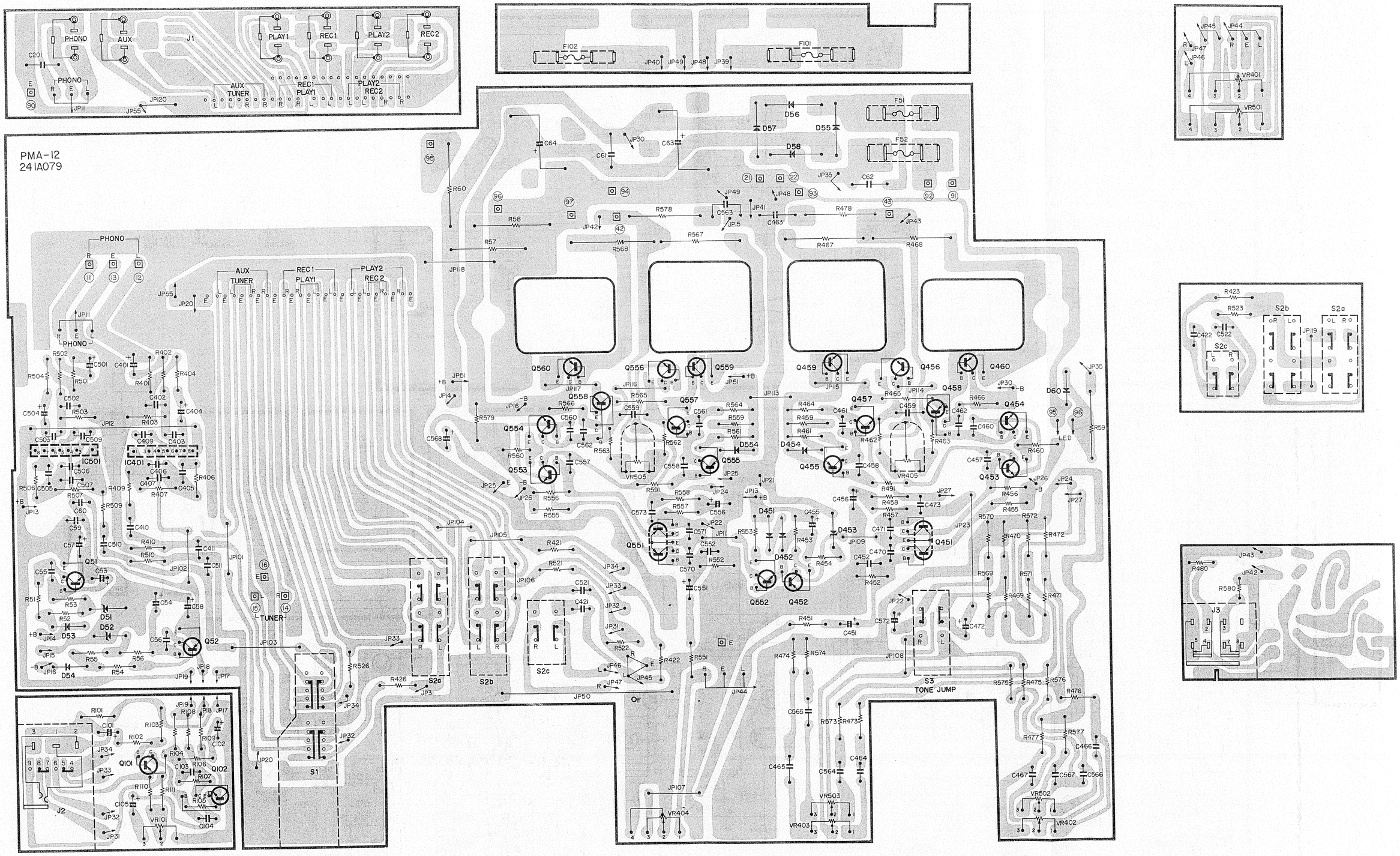
DIAL STRINGING DIAGRAM



CIRCUIT BOARD



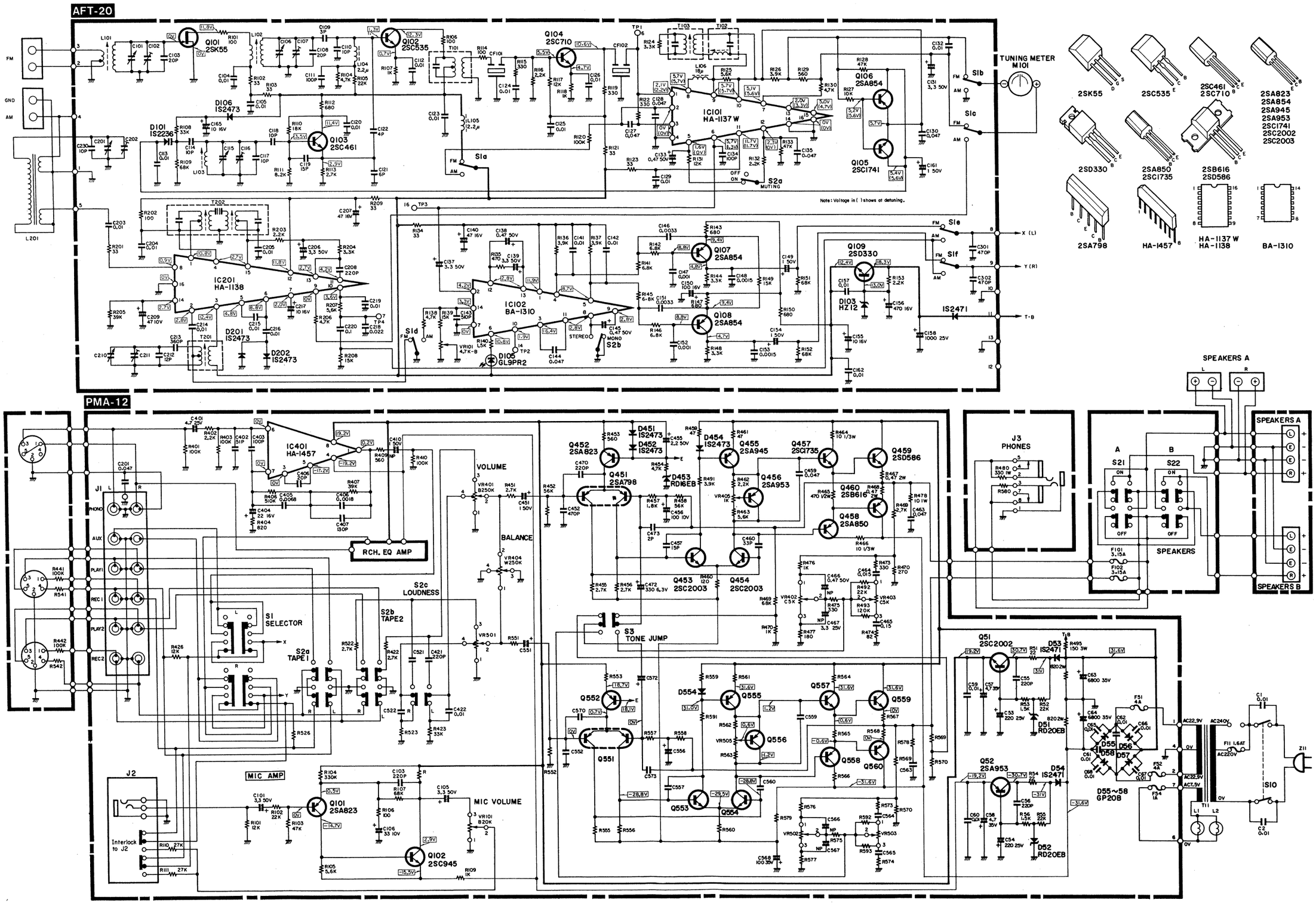
PMA-12
241A079


PHONO
AUX
J1
PLAY1
REC1
PLAY2
REC2
C201
AUX
TUNER
REC1
PLAY1
PLAY2
REC2
JP120
JP55
JP11
F102
F101
JP40
JP49
JP48
JP39
JP45
JP44
JP47
JP46
VR401
VR501
F51
F52
D56
D57
D55
D58
C64
C61
C63
JP30
JP35
C62
JP49
JP48
JP41
C563
C463
R578
R478
JP42
JP15
JP43
R58
R57
R60
R568
R567
R467
R468
JP118
R423
R523
S2b
S2a
C422
C522
S2c
JP119
PHONO
AUX
TUNER
REC1
PLAY1
PLAY2
REC2
JP55
JP20
JP11
R502
R504
R501
C501
C401
R402
R401
R404
C502
C402
C404
C504
R503
R403
JP12
C505
C509
C409
C403
IC501
IC401
C506
C406
C407
C405
R406
R506
C505
R507
R409
R407
R509
C60
C59
C57
C410
C510
R410
R510
C411
C511
JP102
JP101
Q51
C55
C53
R51
R53
R52
D51
D52
D53
C54
C58
C56
Q52
R55
R56
R54
D54
JP16
JP15
JP14
JP13
JP19
JP17
JP18
JP103
JP104
JP105
JP106
JP107
JP108
JP109
JP110
JP111
JP112
JP113
JP114
JP115
JP116
JP117
JP50
JP51
JP52
JP53
JP54
JP31
JP32
JP33
JP34
JP35
JP36
JP37
JP38
JP21
JP22
JP23
JP24
JP25
JP26
JP27
JP28
JP29
JP30
JP31
JP32
JP33
JP34
JP35
JP36
JP37
JP38
JP39
JP40
JP41
JP42
JP43
JP44
JP45
JP46
JP47
JP48
JP49
JP50
JP51
JP52
JP53
JP54
JP55
JP56
JP57
JP58
JP59
JP60
JP61
JP62
JP63
JP64
JP65
JP66
JP67
JP68
JP69
JP70
JP71
JP72
JP73
JP74
JP75
JP76
JP77
JP78
JP79
JP80
JP81
JP82
JP83
JP84
JP85
JP86
JP87
JP88
JP89
JP90
JP91
JP92
JP93
JP94
JP95
JP96
JP97
JP98
JP99
JP100
JP101
JP102
JP103
JP104
JP105
JP106
JP107
JP108
JP109
JP110
JP111
JP112
JP113
JP114
JP115
JP116
JP117
JP118
JP119
JP120
R60
R58
R57
R578
R568
R567
R467
R468
R423
R523
S2b
S2a
C422
C522
S2c
JP119
Q560
Q556
Q559
Q459
Q456
Q460
Q558
Q557
Q554
Q553
Q555
Q554
Q457
Q458
Q454
Q455
Q453
Q451
Q551
Q552
Q452
D451
D452
D453
D454
D554
D60
LED
R579
R566
R565
R564
R559
R556
R555
R562
R563
R560
R591
R558
R557
R573
R572
R571
R570
R569
R574
R575
R576
R577
R476
R475
R474
R473
R472
R471
R470
R469
R480
R580
J3
S3
TONE JUMP
C568
C559
C561
C560
C562
C557
C558
C573
C571
C556
C570
C551
C461
C459
C462
C460
C456
C458
C457
C455
C471
C473
C452
C470
C451
C472
C565
C564
C464
C465
C466
C567
C566
C467
VR505
VR404
VR405
VR503
VR403
VR502
VR402
R422
R551
R521
R522
R526
R426
R451
R453
R454
R455
R456
R458
R457
R459
R461
R463
R465
R466
R462
R464
R491
R492
R493
R494
R495
R496
R497
R498
R499
R500
R501
R502
R503
R504
R505
R506
R507
R508
R509
R510
R511
R512
R513
R514
R515
R516
R517
R518
R519
R520
R521
R522
R523
R524
R525
R526
R527
R528
R529
R530
R531
R532
R533
R534
R535
R536
R537
R538
R539
R540
R541
R542
R543
R544
R545
R546
R547
R548
R549
R550
R551
R552
R553
R554
R555
R556
R557
R558
R559
R560
R561
R562
R563
R564
R565
R566
R567
R568
R569
R570
R571
R572
R573
R574
R575
R576
R577
R578
R579
R580
C501
C502
C503
C504
C505
C506
C507
C508
C509
C510
C511
C512
C513
C514
C515
C516
C517
C518
C519
C520
C521
C522
C523
C524
C525
C526
C527
C528
C529
C530
C531
C532
C533
C534
C535
C536
C537
C538
C539
C540

SCHEMATIC DIAGRAM

AFT-20

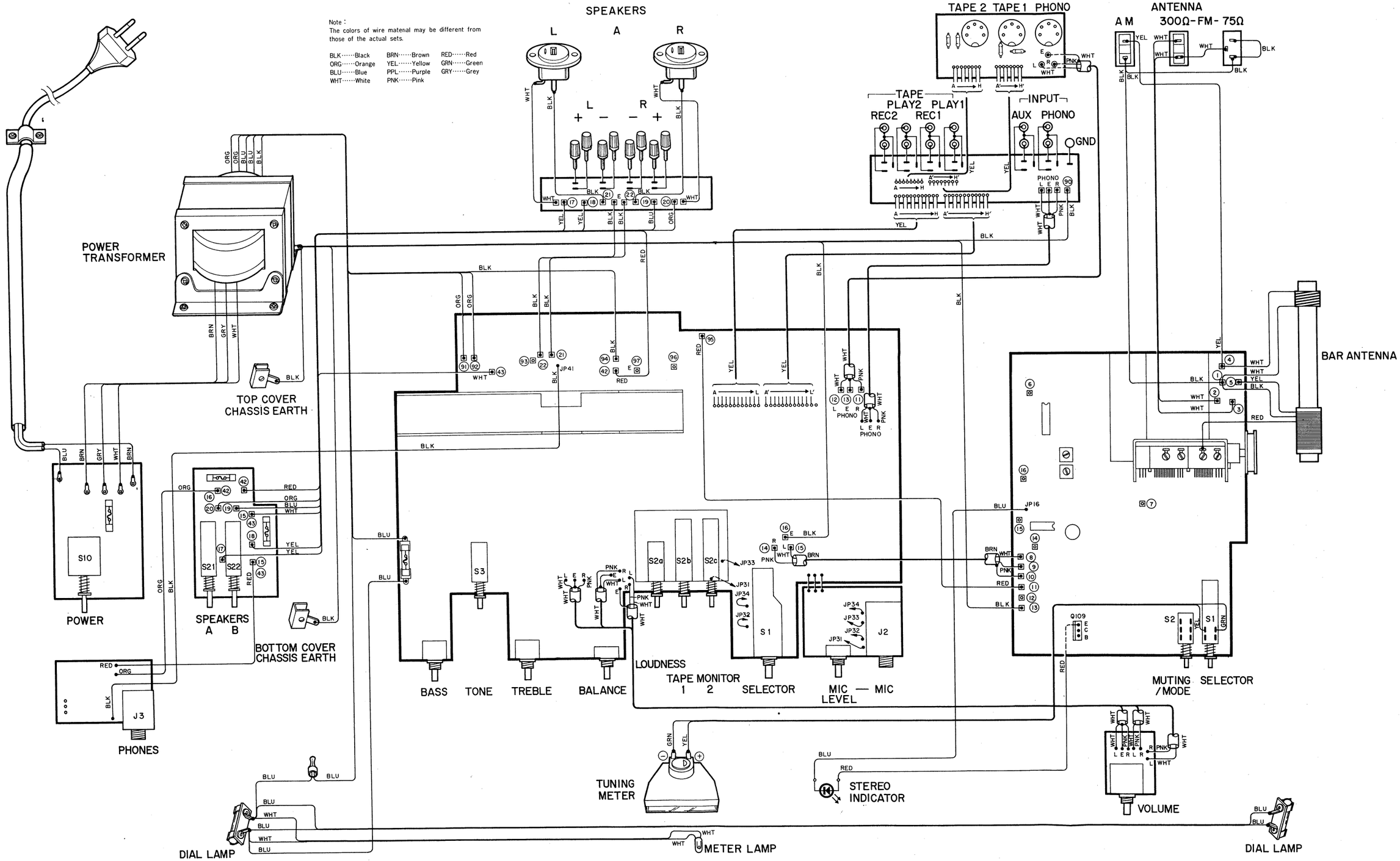
PMA-12



WIRING

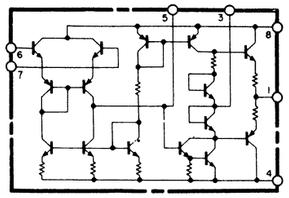
Note :
The colors of wire material may be different from those of the actual sets.

BLK·····Black	BRN·····Brown	RED·····Red
ORG·····Orange	YEL·····Yellow	GRN·····Green
BLU·····Blue	PPL·····Purple	GRY·····Grey
WHT·····White	PNK·····Pink	

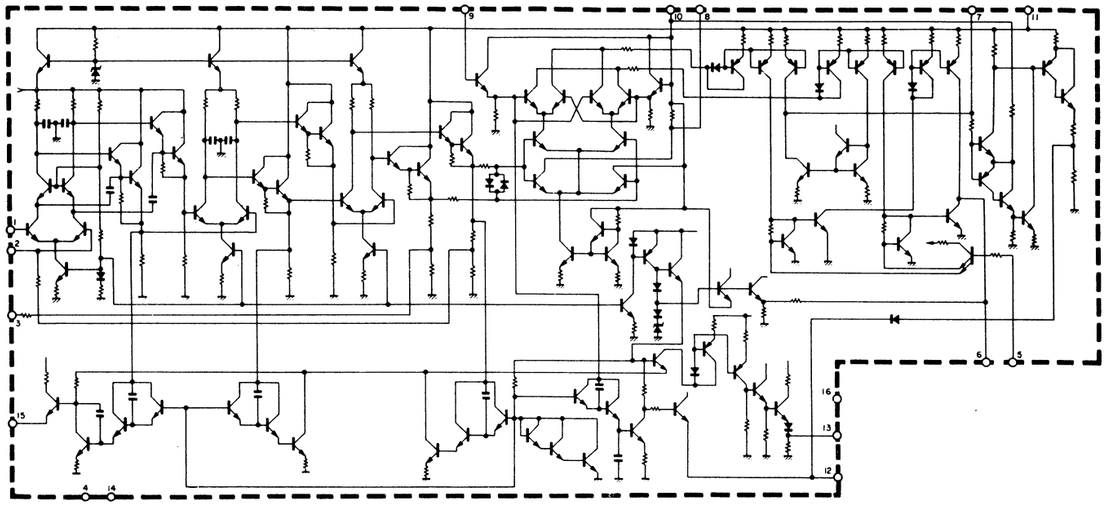


EQUIVALENT CIRCUIT DIAGRAM

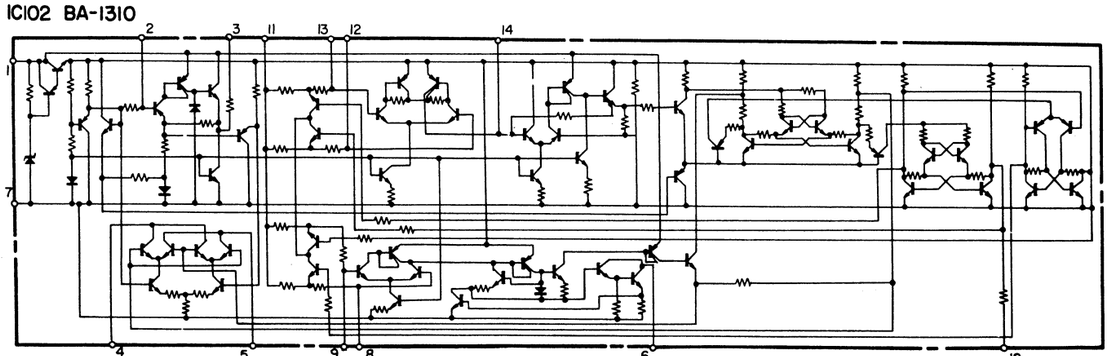
IC401, IC501 HA-1457



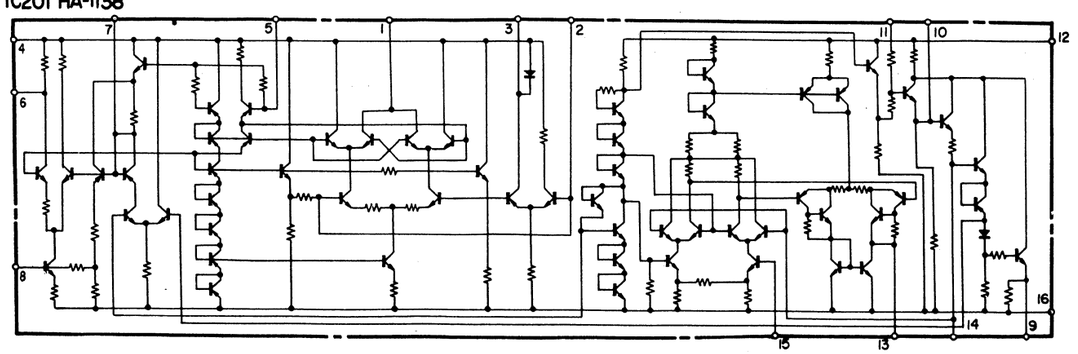
IC101 HA-1137W



IC102 BA-1310



IC201 HA-1138



PARTS LIST

SYMBOL NO.	PART NO.	DESCRIPTION
	DIODES	
D51	M07229320	RD-20EB
D52	M07229320	RD-20EB
D53	M07113321	1S2471
D54	M07113321	1S2471
D55	M07229323	GP20B
D56	M07229323	GP20B
D57	M07229323	GP20B
D58	M07229323	GP20B
D101	M07085320	1S2236
D103	M04137320	HZ-12
D105	M05142322	GL-9PR2
D106	M07060320	1S2473
D201	M07060320	1S2473
D202	M07060320	1S2473
D451	M07060320	1S2473
D452	M07060320	1S2473
D453	M07229321	RD16EB
D454	M07060320	1S2473
D551	M07060320	1S2473
D552	M07060320	1S2473
D553	M07229321	RD16EB
D554	M07060320	1S2473
	TRANSISTORS	
Q51	M07229305	2SC2002
Q52	M07229303	2SA953
Q101	M05104312	2SA823 (MIC AMP)
Q101	M07152303	2SK55
Q102	M07229304	2SC945 (MIC AMP)
Q102	M04070303	2SC535
Q103	M04066313	2SC461
Q104	M04070304	2SC710
Q105	M07137307	2SC1741
Q106	M07137308	2SA854
Q107	M07137308	2SA854
Q108	M07137308	2SA854
Q109	M07061304	2SD330
Q451	M07133303	2SA798
Q452	M05104312	2SA823
Q453	M07229306	2SC2003
Q454	M07229306	2SC2003
Q455	M07229307	2SA954
Q456	M07229303	2SA953
Q457	M07128303	2SC1735
Q458	M07133304	2SA850
Q459	M07229308	2SD586
Q460	M07229309	2SB616
Q551	M07133303	2SA798
Q552	M05104312	2SA823
Q553	M07229306	2SC2003
Q554	M07229306	2SC2003
Q556	M07229303	2SA953
Q557	M07128303	2SC1735
Q558	M07133304	2SA850
Q559	M07229308	2SD586
Q560	M07229309	2SB616

SYMBOL NO.	PART NO.	DESCRIPTION
	ICs	
IC101	M07132343	HA1137W
IC102	M07115344	BA1310
IC201	M07115345	HA1138
IC401	M07229343	HA1457
IC501	M07229343	HA1457
	VOLUME	
VR101	M07229400	STD-A20K20 (MIC LEVEL)
VR401	M07373400	W-B250K35
VR402	M07229403	W-C5K20 (BASS)
VR403	M07229403	W-C5K20 (TREBLE)
VR404	M07229401	STD-W250K20 (BALANCE)
VR501	M07373400	W-B250K35
VR502	M07229403	W-C5K20 (BASS)
VR503	M07229403	W-C5K20 (TREBLE)
	SWITCHES	
S1	M07229450	ROTARY (AM-FM BAND)
S2	M07229451	PUSH FM-MODE, MUTING
S3	M07229452	PUSH
S10	M05113430	PUSH (POWER)
S21	M07219450	PUSH
	ELECTRICAL	
T11	M07362549	TRANS POWER
L1	M07115250	LAMP
L2	M07373250	LAMP
L201	M07152540	COIL-ANT
M101	M07373260	METER
F11	M07362492	FUSE-1.6A-SEMKO
F51	M07362490	FUSE-4A-SEMKO
F52	M07362490	FUSE-4A-SEMKO
F54	M05110472	FUSE-1A-SEMKO
F101	M07362491	FUSE-3.15A-SEMKO
F102	M07362491	FUSE-3.15A-SEMKO
J2	M07229475	JACK (MIC)
J3	M07229476	JACK (HEAD PHONE)
	CABINET	
	M07373210	KNOB METAL
	M07373211	KNOB METAL
	M07229212	KNOB METAL
	M07229211	KNOB METAL
	M07373212	KNOB
	M07373213	KNOB
	M07215195	LEG